sub-Zero®

INDIA

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COLD ROOM CONTROLLER

USER MANUAL

sub-Zero®

SZ-7524-P

Operation

When operating in the field of refrigeration, temperature control is performed with a positive differential. The compressor stops when the Setpoint temperature is reached and restarts when the temperature reaches Setpoint plus the differential.

Two different defrost types can be selected : electrical the compressor is stopped or at cycle inversion (Warm gas, the compressor keeps working). It is also possible to select the interval between defrosts (and the interval count type) and a maximum time (time-out) after which defrost is interrupted. The same probe which controls the defrost cycle is used to control the evaporator fans. It is possible to set the temperature, the delay time after a defrost and relation of fans with the compressor.

A series of “safety controls” (delay at start-up, minimum disable time, minimum time between activation) protects the compressors from close starts. In case of probe error or temperature alarm, the instrument signals the event through acoustic signal and by closing the relay contract. By pressing the mute key, the buzzer is silenced.

These functions can be easily customised by setting some programming parameters. Other parameters allow to suit the instrument to various applications.

SZ-7524-P

Introduction.

sub-Zero®
OPERATING INSTRUCTIONS

Features :

- 2 NTC probes for cold room temp. + Evap. coil temperature.
- Range : -40.0°C to 50.0°C.
- Relay outputs : Compressor + Defrost + Evap. Fan.
- Compressor protection algoriithm.
- Auto/Man defrosting facility (Time/Temp based).
- Buzzer Output

Sr	Parameter	Parameter setting method	value		
			Min	Max	Fac Set
1	Set point	Function : To set the cutout point of the controller.	P3	P2	0.0°C
SET	Press and hold SET key for 2 second and release.	Display will change to set value and LED will flash. The set point value can now be changed by using the UP/DOWN key. After setting the desired value. Press the SET key and you will see “- - -” which confirms that the set point has been stored in memory.			
	To set other parameter				
prg	Press & Hold DOWN(prg) key for 2 seconds.	Display will show P2 & will flash. To go to other parameters, use UP/DOWN keys.			
2	P2 parameter	Function: To set maximum allowable high temperature limit.	XX	50.0°C	50.0°C
P2	To change the P2 parameter, press the SET key. XX = Set point Ht (Message on Display)	Use UP/DOWN keys to set desired value. Once set at a particular value, this will not allow the set point to go above this value and below P3 setting. **Example :** Setting this parameter at 25.0 °C will not allow the set point to go above 25.0°C. Also, if the temperature reaches 25.0°C, the display will show Ht			

		(High Temp) indicating that the temperature has gone above the value in this parameter and at this point the buzzer will come on.			
3	P3 parameter	Function: To set minimum allowable Low temperature limit.	-40.0°C	XX	-40.0°C
P3	To change the P3 parameter, press the SET key XX = Set point Lt (Message on Display)	Use UP/DOWN keys to set desired value. Once set at a will particular value, this not allow the set point to go below this value and above P2 setting. **Example:** Setting this parameter at -30.0°C will not allow the set point to go below -30.0°C. Also, if the temperature reaches -30.0°C, the display will show Lt(Low Temp) indicating that the temperature has gone below the value in this parameter and at this point the buzzer will come on.			
4	P4 parameter	Function : To set the comp. differential (hysterisis).	0.1°C	20.0°C	2.0°C
P4	To change the P4 parameter, press the SET key.	Use UP/DOWN keys to set desired value. Differential between cutout and cutin temperature can be set between 0.1°C to 20.0°C **Example:** If the set point is set at 10.0°C and differential is set at 2.0°C, then when the system reaches 10.0°C, the comp. relay will cutout. Since the differential is 2.0°C, the comp. Relay will cutin at 12.0°C. (10.0°C + 2.0°C)			
5	P5 parameter	Function : To set probe 1 offset (cold room temp.) calibration.	-10.0°C	10.0°C	0.0°C

P5	To change the P5 parameter, press the SET key	Use UP/DOWN keys to set desired value. In time it may be possible that the display may be offset by a degree or so. To compensate for this error, you may need to add or minus the degrees required to achieve the correct temperature. Setting value is from - 10.0°C to + 10.0°C **Example:** The temperature on the display is 28.0°C, whereas the actual temperature is 30.0°C. You will need to set the P5 mode to 2.0°C, which means that once out of the programming mode, that once out of the programming mode, the temperature will show 30.0°C (28.0°C + 2.0°C).			
6	P6 parameter	Function: To set time delay between compressor relay restart time.	0 Min	20 Min	3 Min
P6	To change the P6 parameter, press the SET key.	Use UP/DOWN keys to set desired value. This parameter is used to protect the compressor from restarting in a short period of time and can be set between 0 to 20 minutes. **Example:** If this parameter is set at 3 minutes, the relay will cut off at the set temperature, but will cut off at the set temperature, but will not restart for a minimum of 3 minutes, even if the differential is achieved earlier. This parameter is good to protect the life of the compressor or even in applications where the probe is placed at places where there are sudden & short in temperature like above a cold room door.			

7	P7 parameter	Function: To set drip time for defrost water to drain out.	0 Min	99 Min	1 Min
P7	To change the P7 parameter, press the SET key.	Use UP/DOWN keys to get desired value. This is the time for which the fan, compressor, heater will stay off so that the defrost water can drip & drain out.			
8	P8 parameter	Function: To set compressor relay status on room probe failure.	0	2	1
P8	To change the P8 parameter, press the SET key.	Use UP/DOWN keys to set desired value. When set to 0 = Comp status is ON. 1 = Comp performs a duty cycle 10 minutes ON and 4minutes OFF. 2 = Comp status is OFF.			
9	L1 parameter	Function: Evap. fan stop temp (Coil)	-40.0°C	50.0°C	2.0°C
L1	To change the L1 parameter, press the SET key.	Use UP/DOWN keys to set desired value. This setting is used to limit the max temperature beyond which the Evap. fan will cut off.			
10	L2 parameter	Function: To set time delay between Evap. fan relay restart time.	0 Min	20 Min	1 Min
L2	To change the L2 parameter, press the SET key.	Use UP/DOWN keys to set desired value. If for example this is set at 3 minutes, the Evap. Fan relay will cutoff at the temp. set by L1 parameter but the fan will not come on for a minimum of 3 minutes even if L4 is achieved earlier.			
11	L3 parameter	Function: Evap. Fan operation when compressor is off.	0	1	1
L3	To change the L3 parameter, press the	Use UP/DOWN keys to set desired value. 0 = Evap. Fan is off when comp. is off			

	SET key.	1 = Evap. Fan will stay on when compressor is off.			
12	L4 parameter	Function: Evap. Fan differential (hysterisis)	0.1°C	20.0°C	2.0°C
L4	To change the L4 parameter, press the SET key.	Use UP/DOWN keys to set desired value. **Example:** If L1 parameter is set to 2.0°C, and the L4 is set to 2.0°C, then Evap. fan will cut off at 2.0°C and restart only at 0.0°C			
13	L5 parameter	Function: To set probe 2 offset calibration (Evap. fan coil probe)	-10.0°C	10.0°C	0.0°C
L5	To change the L5 parameter, press the SET key.	Use UP/DOWN keys to set desired value. In time it may be possible that the temp. on the display may be offset by a degree or so. To compensate for this error, you may need to add or minus the degrees required to achieve the correct temperature. Setting value is from -10.0°C to + 10.0°C			
14	L6 parameter	Function: Evap. fan status during defrost.	0	1	1
L6	To change the L6 parameter, press the SET key.	Use UP/DOWN keys to set desired value. 1 = Evap. fan will stay off during defrost 0 = Evap. fan will stay on during defrost.			
15	E1 parameter	Function: To set type of defrost	0	1	0
E1	To change the E1 parameter, press the SET key.	Use UP/DOWN keys to set desired value. 0 = Heater defrost in which case compressor is off. 1 = Hot gas defrost where compressor is on.			
16	E2 parameter	Function: To set type of computation for defrost time.	0	1	0

E2	To change the E2 parameter, press the SET key.	Use UP/DOWN keys to set desired value. 0 = Total of real time. For example if the unit goes into defrost at this moment, the calculation of time will start at that movement. 1 = Sum of total compressor operating times. This means that for time calculation, the unit will add the total time the compressor has been in an ON mode. 7524 keeps a record of the hours worked +/-1 hour incase of a power failure. Eg. If E3 is set to 6 hrs and 3.1/2 hrs have passed after unit has started and power fails, then defrost cycle will start after 3 hours when power resumes.			
17	E3 parameter	Function: To set Defrost frequency.	1 Hr	31 Hrs	6 Hrs
E3	To change the E3 parameter, press the SET key	Use UP/DOWN keys to set desired value. This is the amount of time between two defrost cycles.			
18	E4 parameter	Function: To set maximum Defrost duration	0 Min	99 Min	30 Min
E4	To change the E4 parameter, press the SET key.	Use UP/DOWN keys to set desired value. This is the maximum amount of time allowed for a defrost. If set to 0, there will be no defrost cycle.			
19	E5 parameter	Defrost stop temperature (Evap. coil probe)	-40.0°C	50.0°C	8.0°C
E5	To change the E5 parameter, press the SET key.	This is the maximum temperature allowable at which the defrost process will stop.			
Defrost will stop according to E4 & E5 parameter, whichever is achieved earlier.					

20	E8 parameter	Function: Defrost duration during Coil probe failure (Only manual)	1 Min	10 Min	5 Min
E8	To change the E8 parameter, press the SET key.	Use UP/DOWN keys to get desired value and press SET key . **Example:** if this is set to 5 min, then manual defrost for 5 min will take place during Coil probe fail.			
21	AL parameter	Function: Power on time delay for Alarm	0Min	99Min	30Min
AL	To change the AL parameter, press the SET key.	Use UP/DOWN keys to get desired value and press SET key . **Example :** If you set this parameter to 20, once the power is switched on, the alarm will not activate for 20 minutes after the power is switched on. This is most useful to avoid the nuisance alarms when the ambients are high when the machine is switched on after a long time. Note : After pressing Mute key, buzzer will come ON, after every 10 Mins. til that fault gets cleared.			
22	FS parameter	Revert to factory set parameter	0	1	0
FS	To change theFS parameter, press the SET key.	1 = Revert to factory set parameter Useful to debug setting related problems.			
23	LP parameter	Function: To lock keypad.	0	1	0
LP	To change the LP parameter, press the SET key.	Use UP/DOWN keys to set desired value. This parameter can lock the keypad so that tampering is not possible by by-standers. 1 actives keypad lock			

		0 de-activates keypadlock. on activation, all the parameters can only be viewed. but not modified.			
24	rS parameter	Function: To change the resolution.	0	1	0
rS	To change the rS parameter, press the SET key.	Use UP/DOWN keys to set desired value. This parameter when set to 0,it will take all parameter in 0.1°C resolution. This parameter when set to 1,it will take all parameter in 1°C resolution. **Note :** Temperature and parameter will also change accordingly.			
25	EP parameter	Function: To end programming.			
EP	To end programming press the SET key.	Once the SET key is pressed, the control goes into the normal mode and displays the temperature and all settings are recorded.			
▲	UP Key	To view a coil temp. UP key.			
prg	Down Key	Down & Program key.			
	Mute Key	This key will mute the buzzer.			
	Manual defrost SZ-7524-P	To force a Manual Defrost, press this key for 4 seconds the unit will go into defrost mode. If E4 parameter is set to 0, or Coil temp. is greater than defrost stop temp. this key will remain inactive.			
SET	Set Key	Set key.			

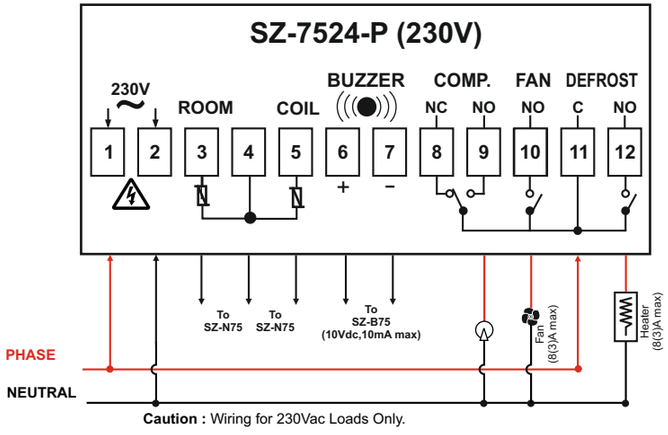
Operating messages and Icon status

Message	Description	Parameter
Ht	Temperature above the maximum limit of the set point.	P2
Lt	Temperature below the minimum limit of the set point.	P3
PP	Probe short circuit, circuit open or without probe, or temperature < -40.0°C or > 50.0°C	
● ❄ On/Off	Comp. Relay on/off	Set Point, P4, P6
((●)) Flashing	Alarm (Ht, Lt, PP)	
● ❄ On	Defrosting in progress	E3, E4, E5
● On/Off	Evap. fan Relay on/off	L1, L4
● ❄ Flashing	Comp. Relay in Timedelay	P6
● Flashing	Evap. Fan Relay in Timedelay	L2

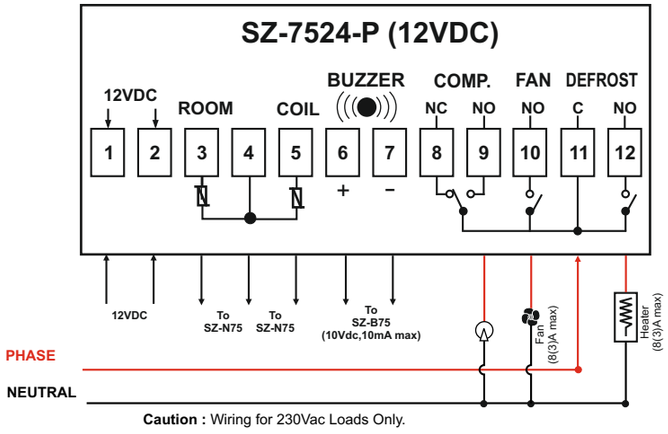
Technical data :

Housing : Black, ABS Plastic.
Front Cover : Red Ploycarbonate plastic.
Dimensions : Front - 75 x 34.5 MM, Depth- 71MM(w/o. back lid).
Panel Cutout : 29X71mm.
Mounting : Flush panel mounting with fasteners.
Protection : Front panel is waterproof & I.P.65 rated.
Connection : Screw terminal blocks. ≤ 2.5sq mm one wire/terminal only.
Display : 3X14.2 MM (0.56")LED.
Data Storage : Non-Volatile EEPROM Memory.
Power Input (Options) : 230Vac +/-10%, 50-60Hz, Other on request.
Operating Temp : 5°C to 50°C(non-condensing).
Storage temp : -20°C to 70°C(non-condensing).
Output : 3 SPDT relay, 8(3)A, 250Vac.
Input : 2 NTC Probe.
Range : -40.0°C to +50.0°C.
Resolution : 1°C / 0.1°C.
Accuracy : +/-1°C.
Probe Tolerance at 25°C : +/-0.3°C.
Alarm (Buzzer) : SZ-B75. 10V,10mA.

SUGGESTED WIRING DIAGRAM



Caution : Wiring for 230Vac Loads Only.



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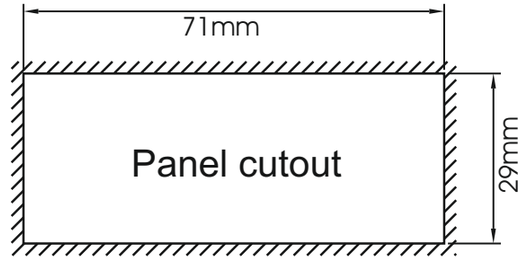

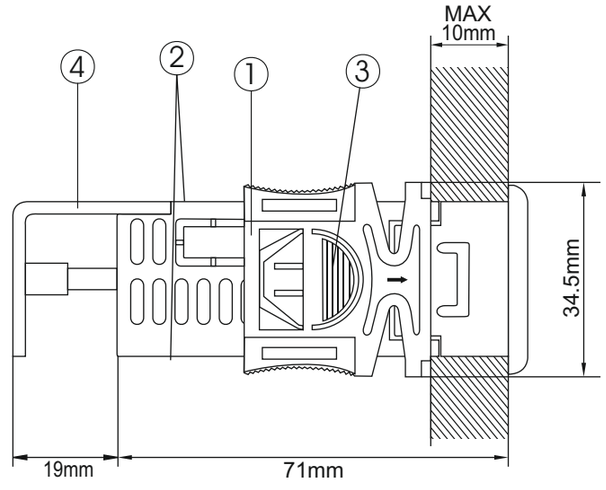

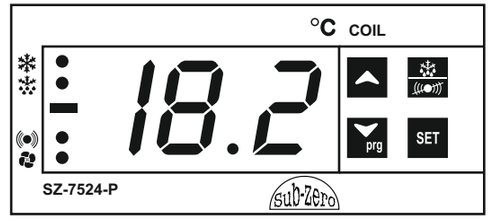

Installation : Fixing and dimensions of panel models:
To fix the unit, slide the fastener ① through the guides ② as per the position shown in the figure. Move the fastener in the direction of the arrow, pressing tab ③ it permits to move the fastener in the opposite direction of the arrow. Once the controller has been connected, they should be covered with the lid④ Silicon sealant should be applied along the perimeter of the panel cut out or a rubber 'O' ring supplied before the unit is fitted to increase protection against water seepage.

Controller :Controller should be installed in a place protected by vibration, water and corrosive gasses and where ambient temperature does not exceed the values specified in the technical data.

Probe : To give a correct reading, the probe must be installed in a place protected from thermal influences, which may affect the temperature to be controlled.

CAUTION

WIRING : The probe and its corresponding wires should never be installed in a conduit next to control or power supply lines. The electrical wiring should be done as shown in the diagram. The power supply circuit should be connected to a protection switch. The terminals admit wires of upto 2.5sq mm.

WARNING : Improper wiring may cause irreparable damage and personal injury. Kindly ensure that wiring is done by qualified personnel only.

Maintenance : Cleaning: Clean the surface of the controller with a soft moist cloth. Do not use abrasive detergents, petrol, alcohol or solvents.

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OUR OTHER PRODUCTS

sub-Zero®
INDIA

Cold Room Controller.
Chiller Controller.
Two Compressors Controller.
Heating Controller.
Humidity Controller.
Pressure Controller.

CASTLE™

Ball Valves.
Globe Valves.
Hand Valves.
Flow Switches.
Solenoid Valves.